

NOTE ON THE STERILIZATION OF CATGUT BY BOILING IN OLIVE OIL.

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CATGUT subjected to the ether-alcohol-bichloride process is unreliable as to its asepticity, and if kept long in bichloride becomes brittle and hard. Catgut in juniper oil is unreliable. Sterilization by boiling in alcohol is practised to some extent. Without considerable apparatus the method is difficult and expensive. Heat sterilization is more desirable and more efficient than chemical action, and I think the best medium is olive oil. This is cheap, non-irritating, non-inflammable, and has little or no odor. To try this medium a series of experiments were made, having two objects in view,—

- (1) As to the possibility of sterilizing catgut by heat.
- (2) The physical effect of high temperature upon it.

Three pieces of gut, each a yard long, were wound on glass slides, immersed in olive oil in a two-ounce, salt-mouth, glass-stoppered bottle, sealed, and the whole placed in a water-bath, and the vessel covered. The temperature was raised to boiling-point (212° F.), and kept there for three hours. For some reason the oil became turbid and cloudy, but cleared up again after two or three days. This marred the appearance very much, and before it was discovered that it would clear up of itself, some eight or ten samples were put through and then laid aside. After satisfying myself that the gut was not impaired, a sealed jar containing a single roll was sent to Professor Adolph Gehrmann, of the College of Physicians and Surgeons, Chicago. He kindly made a bacteriological examination for me, and wrote as follows:

“*Method.*—The jar was disinfected with bichloride, opened, placed in a covered sterile dish, the roll removed and placed in

another dish containing bouillon, where it remained three hours, being frequently agitated to remove all the liquid (oil). The gut was then cut into short pieces as it lay in the dish, washed in bouillon, and placed in a Petri dish on a layer of peptone-agar, and covered with liquefied agar.

"The slide, having some gut still attached, was placed in bouillon.

"*Control*.—Dishes containing similar culture media arranged side by side with the first. In these were dipped the forceps, knives, wires, and foil before and after handling the gut.

"*Result*.—Nine days' observation has shown the catgut, liquid, and slide to be entirely sterile. At no point has a colony appeared, either in the test or controls.

"There was no particular reason for keeping the temperature up for three hours, and I have no doubt now but that less time would suffice.

"As to the physical effect of high temperature upon the catgut:

"(a) Eight pieces were placed in a water-bath at 212° F. for two to four hours. Sizes varying from 0 to 8. Little change. It became smoother and more translucent. Strength remained the same as before.

"(b) Higher temperatures by use of sand-bath and chemical thermometer.

"Two pieces kept at 220 – 240° F. for four hours. No change. Two at 320° F. for four hours; more brittle. Raised to 370 – 380° F., became so brittle as to be useless. This was the greatest heat I could obtain with the small alcohol-lamp I had. Just what the boiling-point of the oil is I do not know, probably more than 400° F.

"Thinking that possibly the favorable results might be due to a superior quality of gut, I obtained four different specimens of quite ordinary quality,—fiddle-strings, guitar-strings, etc. These, tested very much as the first, gave similar results.

"(c) Finally all these pieces were resealed and laid aside for six weeks.

"Out of the eight subjected to 212° F., but one had become

brittle. This had been wound tightly, and broke where the edges of the slide had kinked it. Two pieces subjected to 240° F. for two hours were brittle where tightly wound. Where they were loose the strength was not changed. Two pieces subjected to 320° F. were dark and brittle, in fact useless.

“(d) What remained of all these were washed in alcohol, then immersed in absolute alcohol for four days. When examined there had been no change. Much better results would have been obtained by using reels or cylinders to wind the gut upon, instead of glass slides, which kink and cut it.”

These few tests, while not exhaustive, will, I think, justify the following conclusions :

Catgut can be rendered sterile by heating in oil to a temperature of 212° F. for three hours.

The method is reliable, cheap, and rapid.

The quality is not impaired, and gut so treated is more satisfactory as to strength and smoothness than if subjected to the ether-alcohol-bichloride process.

A temperature higher than 212° F. is not necessary for sterilizing, and is an injury to the gut.